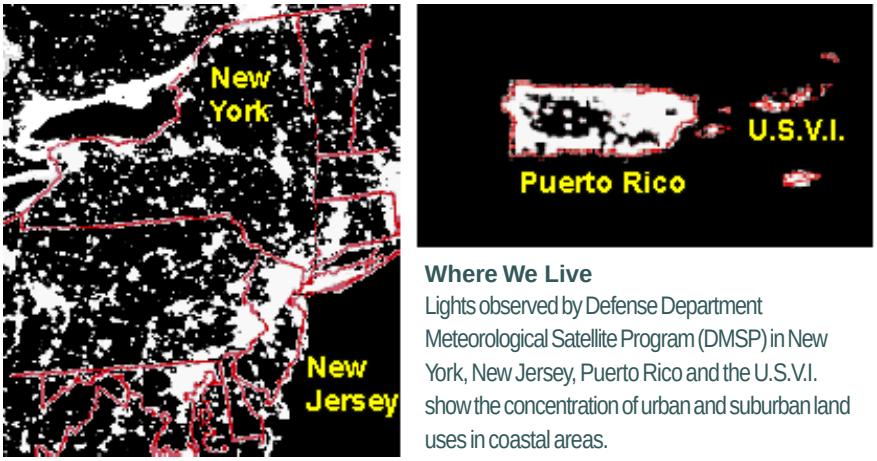
Land Use and Ecosystem Health

Physical changes in the Region's landscape—including urban sprawl, the filling of wetlands, and the loss of open space—leave their impact on environmental quality. Healthy ecosystems provide habitat for countless animal and plant species, biodiversity, water purification and nutrient recycling, as well as important recreational and economic benefits. Rare plants, for example, threatened by habitat change or disruption, may prove to have important medicinal and economic value. In addition, direct economic benefits related to healthy ecosystems include tourism, hunting, boating, fishing, and the observation and photography of wildlife. Undeveloped land also provides economic and aesthetic benefits to adjacent residents.



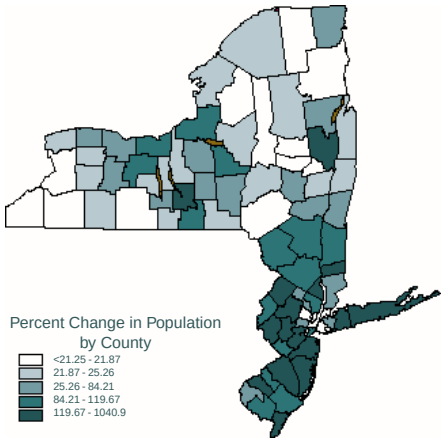
Where We Live
Lights observed by Defense Department Meteorological Satellite Program (DMSP) in New York, New Jersey, Puerto Rico and the U.S.V.I. show the concentration of urban and suburban land uses in coastal areas.

Source: Defense Department Meteorological Satellite Program (DMSP)
Figure 20

Clearly, the northeastern states of New York and New Jersey have very different ecosystems than the Caribbean islands of Puerto Rico and the Virgin Islands. Still, these diverse areas face similar pressures. Suburban sprawl, which has placed substantial pressure on coastal ecosystems, agricultural land, and other open space since the end of the Second World War continues. This type of development affects the environment through increased reliance on automobiles, runoff to water bodies from lawns and impervious surfaces, and the destruction of wildlife habitat and sensitive ecosystems such as wetlands.

The satellite images of light emitted by the Region's cities and suburbs demonstrate the proximity of its population centers to sensitive coastal, river, lake and estuarine environments (Figure 20). Over the past 50 years, populations in areas surrounding Manhattan, Newark, Albany and other urban centers have grown dramatically (Figure 21). Similar patterns of growth have occurred around San Juan in Puerto Rico and Charlotte Amalie, the capital of St. Thomas. The Region's population is expected to continue growing well into the 21st century. The conversion of rural lands to developed lands also continues throughout the Region. Data collected by the U.S. Department of

Percentage Change in Population, New York and New Jersey, 1940 to 1990



Source: U.S. Department of Commerce, Bureau of Census
Figure 21

New York's Adirondack Park

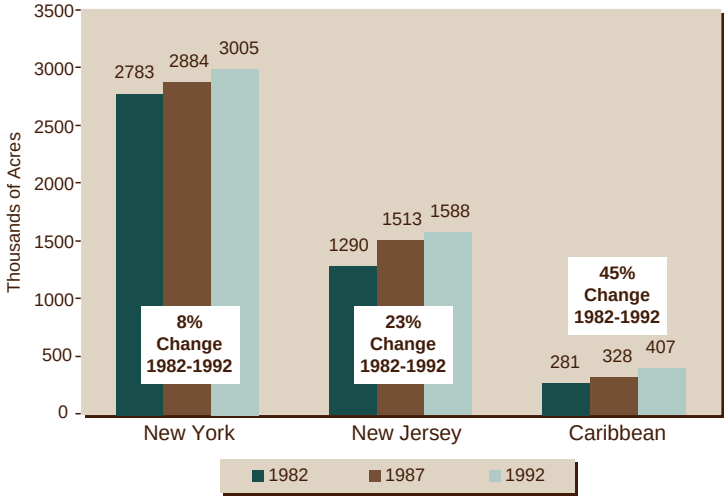
New York's Adirondack Park represents one of the Region's unique efforts to balance land conservation with the pressures of commercial and recreational development. Located in the state's northeastern corner, the area's hardwood forests have been utilized for timber production since the 1850s. In an effort to conserve forest land from the booming timber trade, the state established the Adirondack Forest Preserve in 1885, creating a 680,000 acre wilderness area. In 1892, New York created the Adirondack Park, a larger land mass surrounding the Forest Preserve. By the 1920s, tourism had surpassed the timber trade as the region's leading industry. Today, vacationers continue to travel to the park to enjoy the area's more than 100 mountains and 200 lakes for hiking, boating, fishing and other activities.

The Adirondack Forest Preserve now includes 2.5 million acres of forest, accounting for 89 percent of New York's protected forests. The Preserve's 2.5 million protected acres, coupled with 3.5 million acres of privately-owned land, comprise the larger Adirondack Park. With a total of 6 million acres, the Adirondack Park is the largest park in the continental United States.

While both the Adirondack Park and the Adirondack Forest Preserve have been protected from timber production, the heavy tourist trade creates its own environmental pressures stemming from overuse of the area's trails and lakes. Heavy littering has threatened the scenic beauty of the park as well as the health of its flora and fauna. In addition, the lakes and forests of the park face substantial threats posed by acid rain. As discussed in the *Air Quality* chapter, EPA is working with its federal, state, and local partners to address the acid rain problem here and throughout the country.

Agriculture show that from 1982 to 1992, the amount of land classified as "developed" and comprising urban and suburban areas of ten acres or more, increased from 8 to 45 percent across the Region (Figure 22).

Conversion of Rural to Developed Lands Continues



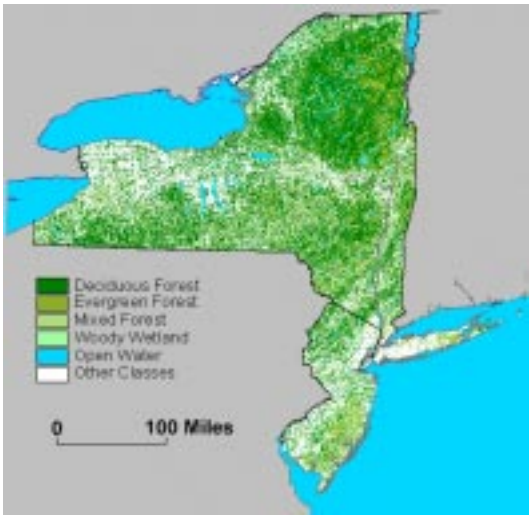
Source: USDA 1992 Natural Resources Inventory.

Figure 22

Forests

Although the Region is among the most densely populated in the country, the majority of its land mass is still rural cropland, pasture and forest. Forests cover more than 42 percent of New Jersey and 62 percent of New York State (Figure 23). With the exception of some protected areas (such as the Pine Barrens, the Adirondack State Park and the Caribbean National Forest), the Region's forests and landscape have undergone significant change, beginning with European settlement and continuing to today. Most of the forest has already been cut more than once.

Forest Cover in New York and New Jersey



Source: Multi-Resolution Landscape Characteristics Database.

Figure 23

Among the Region's protected forests is the only tropical rain forest in the National Forest System; the Caribbean National Forest, located 40 km southeast of San Juan, Puerto Rico. Established as a protected area by Spain in 1876, it is one of the oldest reserves in the Western Hemisphere. The Forest receives more rain than any other National Forest (up to 240 inches per year) and is home to incredibly diverse wildlife, including more than 240 native tree and plant species.

New Jersey's Pineland National Reserve

New Jersey's Pineland National Reserve encompasses 1.1 million acres, approximately 22 percent of the state's total land area. Established by Congress in 1978, the Reserve is monitored and protected by the New Jersey Pineland Commission.

The Pinelands, characterized by sandy soil and relatively level terrain, lies in the Atlantic Outer Coastal Plain. Originally called the Pine Barrens by local citizens who found the region difficult to farm, this area now hosts blueberry farms and cranberry bogs as well as row and field crops. Underlying the Pineland National Reserve is a vast network of aquifers that represent one of the largest untapped sources of drinking water in the United States.

The Pinelands ecosystem is home to over 1,200 plant and animal species, approximately 100 of which are considered threatened or endangered. These species include plants such as the Curly Grass fern and the Broom Crowberry, and animals including the Timber rattlesnake and the Pine Barren tree frog. The Reserve's dense forests are made up of pine, oak, and cedar. One particularly unique portion of the Reserve is its "pygmy forest," consisting of 12,000 acres of dwarfed, mature pine and oak trees all less than 11 feet high.

In addition to providing habitat for these unique species, the Reserve provides numerous recreational opportunities. Visitors can enjoy scenic hikes on the woodland trails, boating, fishing, canoeing, camping, hunting and horseback riding.

Wetlands

Wetlands provide wildlife habitat, water purification, nutrient recycling and a range of recreational opportunities. They serve as natural contaminant filters and vital buffers against flooding and soil erosion. Land use changes over time have significantly reduced the quantity and quality of wetlands throughout Region 2. In New York, one-half of the 160 species identified as endangered or threatened by the Department of Environmental Conservation are wetland-dependent.

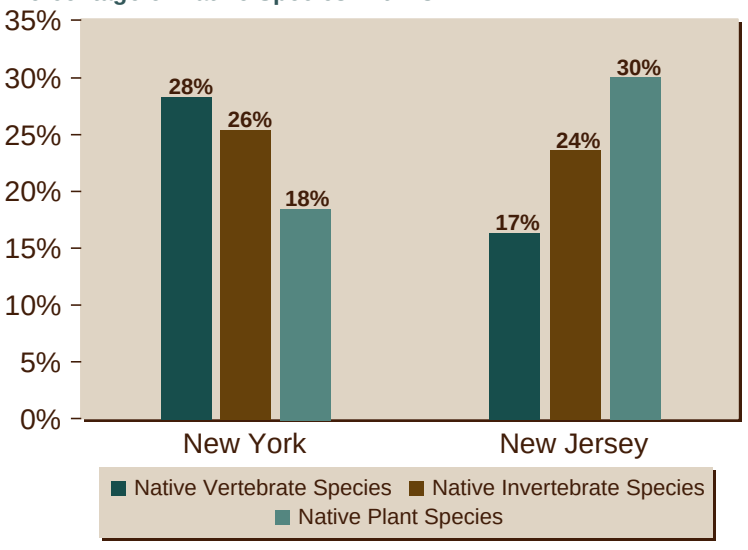
From 1780 to 1980, wetland loss occurred at a rapid pace. Over that time approximately 60 percent of New York's wetland area was lost, primarily due to agricultural conversion. New Jersey lost about 40 percent of its wetlands, for agricultural, transportation, housing and industrial uses. As in the northeastern part of the Region, many of Puerto Rico's wetlands were filled and converted to agricultural use or lost to increased development. Most of the Virgin Islands' wetlands are coastal, and face increasing threats from tourism-related development.

As we have learned more about the importance of wetlands, laws have been enacted to restrict the destruction of these habitats, resulting in a significant decline in wetlands loss. In New York, New Jersey and the Caribbean, shallow-water, marshes, and forested wetland acreage has continued to decline while wetland acreage around lakes has modestly increased.

Endangered Species

One useful indicator of the health of a region's ecosystems is the condition of its plant and animal species. Figure 24 illustrates the percentage of native species that are defined by the Nature Conservancy as being "at risk" in New York and New Jersey.

Percentage of Native Species "At Risk"



Source: The Nature Conservancy, New Jersey State of the Environment Report.

Figure 24

Caribbean Coral Reefs

Extensive coral reefs along the coasts of Puerto Rico and the Virgin Islands represent one of the Region's most important ecological resources. Puerto Rico possesses an estimated 500 square kilometers of reef area, while the Virgin Islands have approximately 200 square kilometers. In addition to providing habitat for thousands of aquatic species, reefs provide recreational opportunities for divers and snorkelers, and help protect coastal mangroves and seagrass from wave damage during storms.

Many reefs of Puerto Rico and the Virgin Islands face increasing threats resulting from overfishing, boat anchors, and coral collecting by divers and snorkelers. In many nearshore areas, the health of reef ecosystems is also declining due to sewage disposal and erosion, both of which result in increased siltation that can block sunlight and reduce photosynthesis. Sewage and erosion also supply nutrients fostering algal growth that damages coral species. This condition is often exacerbated by over-fishing of herbivorous fish species that help control algal growth. Similarly, over-fishing of species that rely on coral predators like star fish and urchins can also affect the health of reef ecosystems. Along Puerto Rico's south shore, inshore reefs display signs of degradation including local extinctions, displacement of corals by sponges, and coral bleaching. In the Virgin Islands, many reefs are threatened by overfishing and white-band disease, a condition affecting staghorn and elkhorn corals.

Since coral reefs are affected by a number of direct and indirect physical and chemical processes, their protection requires cooperation among multiple agencies and jurisdictions. EPA is working with other public and private organizations to promote reef protection by establishing reserve areas, preventing over-fishing, and limiting the impacts of land conversion, sewage and erosion.

EPA's Role

EPA and other federal agencies have limited direct authority over land use planning decisions that impact wetlands and terrestrial ecosystems. While most of these decisions are made by the states or local authorities, EPA can affect land use decisions through its authority to review environmental impact statements, and its work with the states on complex air and water quality issues.

The Agency does play a role in wetlands management and works with the U.S. Army Corps of Engineers (COE) in implementing the nation's wetlands program, with assistance from the Fish and Wildlife Service and the National Marine Fisheries Service. EPA provides direction, develops policy, and encourages and enables others to effectively protect and restore the nation's wetlands and associated ecosystems, including shallow open waters and free-flowing streams. The wetlands program engages in two principal activities—establishing national standards and assisting others in achieving them.

EPA also recognizes that one way to limit sprawl and the conversion of more open space or forest land is to encourage growth in existing urban and suburban areas. Through transportation planning requirements outlined in the Clean Air Act, EPA works with states and air pollution control districts to promote environmentally-friendly land-use and transportation decisions. EPA is also pursuing the goal of more environmentally-acceptable development through initiatives such as brownfields redevelopment, community-based environmental protection and sustainable development. We discuss these programs in more detail in the *Looking Ahead* chapter.

Melina T Yáñez

Puerto Rico's Cabo Rojo Salt Flats

The Cabo Rojo Salt Flats are one of the Region's most unique and irreplaceable ecosystems. The Salt Flats, located on the southwestern tip of Puerto Rico, consist of 1900 acres of sparsely vegetated land and two large, shallow lagoons. Separated from the Caribbean Sea by narrow strips of dry coastal forest, the Flats border the Boqueron State Forest and the Cabo Rojo National Wildlife Refuge. This is a particularly interesting ecosystem because portions of the lagoons were once drained to create evaporation basins for salt production. It is believed these alterations actually enhanced the diversity of wildlife habitat provided by the Flats, which are privately owned by three local families.

The entire Cabo Rojo peninsula is used for hiking, picnicking, beach recreation and bird watching. More than 40,000 birds depend on the Salt Flats as a wintering area and migration stopover. The Flats provide habitat for 118 migratory songbirds, as well as federally-threatened or endangered species including the piping plover, peregrine falcon and brown pelican. The coastal waters and land also provide feeding and nesting for West Indian Manatees, and Green Sea, Hawksbill and Leatherback Turtles.

As a result of increased demand for beach-front property, the Salt Flats have been targeted for development. The current landowners recently placed the Salt Flat property on the market for $8.5 million. Construction has already begun on a $20 million resort and marina in Boqueron, and a $650 million resort and condo complex on land bordering the Wildlife Reserve is currently under consideration.

To prevent developing the Salt Flats and irreversibly altering this complex ecosystem, the Trust for Public Land, a non-profit organization dedicated to assisting in the acquisition of land for conservation, is attempting to raise money to purchase the Salt Flats. One possible funding source is the Fish and Wildlife Service's Land and Water Conservation Fund, which uses oil and gas leasing royalties to purchase valuable and irreplaceable national lands. The Salt Flats currently rank 76th on the Fish and Wildlife Service's National Priority List for Land and Water Conservation Fund allocations, but no money has yet been allocated for preserving the Flats.

Other Region 2 Projects on the Fish and Wildlife Service National Priority List

Rank	Project Name	State	Target
2	Cape May	NJ	Significant Wildlife Habitat
21	E.B. Forsythe	NJ	Significant Wildlife Habitat
63	Montezuma	NY	Significant Wetlands
95	Great Swamp	NJ	Significant Wildlife Habitat
98	Long Island Complex	NY	Endangered Species
102	Wallkill River	NJ	Significant Wetlands

Jenine Tankoos

For More Information

U.S. Fish and Wildlife Service:
http://www.fws.gov/

New York State Department of Environmental Conservation:
Division of Lands and Forests
518-457-2475

Division of Fish and Wildlife
518-457-5690
http://www.dec.state.ny.us/

New Jersey Department of Environmental Protection:
609-292-3131
http://www.state.nj.us/dep/

Puerto Rico Department of Natural and Environmental Resources:
787-724-8774

Virgin Islands Department of Planning and Natural Resources:
340-773-0565